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ROCKS and MINERALS

A Magazine for Mineralogist,
Geologist and Collector . . .

. . . . . Official Journal of
The Rocks and Minerals Association

.. MAY, 1937 ..

Vol. 12 No. 5 FIFTEEN CENTS Whole No. 70

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ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

M A Y
. . 1937 . .

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ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

CHIPS FROM THE QUARRY

(Formerly the Bulletin Board)

A NEW LAPIDARY MACHINE

The Stonecrafter's Machine has recently been put on the market by New York's most noted stone craftsman, John Vlismas of 244 E. 77th St., New York City. The machine is completely equipped for slicing, grinding and polishing minerals and is especially adapted for making ornaments of odd shapes as spheres, ash trays, paper weights, book ends, etc.

At the big exhibit of the New York Mineralogical Club in Maxwell Hall, of the American Museum of Natural History, New York City, held on Saturday, March 13th, Mr. Vlismas gave many demonstrations on his new machine and a large crowd of interested spectators were constantly in attendance.

The complete machine plus 5 courses of instructions sells for $85.00.

AN APOLOGY

In the April issue of **Rocks and Minerals,** a notice appeared advising that **Rocks and Minerals** would be represented by the Stephen Varni Co., Inc., at the New York Collector's Show in New York City April 5th to 9th. Unfortunately Mr. Varni suffered a breakdown while on a recent visit to Florida which forced him to enter a sanitarium and his exhibit at the Show had to be cancelled at the last moment.

It is gratifying to report, however, that Mr. Varni has regained his health and is back at his office again.

A Correction.

In the March, 1937, issue of **Rocks and Minerals,** on page 72, the elevations of North and South Baldface Mountains were given as 9,6605 and 8,585 feet respectively. These elevations were incorrect; they should have been 3,605 and 3.585 feet respectively.

We regret that this error had to creep into Mr. Chandler's very interesting article but are grateful to those who called it to our attention. Will subscribers kindly make this correction in their copies. first column, third paragraph, 5th and 6th lines?

R. Emmet Doherty and Peter Zodac, President and Secretary respectively, of the Rocks and Minerals Association, together with Mrs. Doherty and her mother, Mrs. Evelyn McAdie, spent a few days visiting Washington, D. C., and the mineral localities around Statesville, N. C.

In Washington they called on William R. Thompson and examined his very fine collection of minerals and also visited the National Museum where Dr. William F. Foshag, Curator of Mineralogy, extended them many courtesies that were deeply appreciated. Many fine minerals not on display including a host of recent acquisitions were available for their inspection.

In Statesville, Mr. J. T. Walden, a member of the Rocks and Minerals Association, acting as guide and host, conducted the visitors to interesting quartz localities of the district and also to the famous hiddenite mine at Hiddenite.

We regret to advise that Mr. C. L. Brock of the American Mineral Exchange, Houston, Texas, has been seriously ill. This will account for any delays in the filling of orders.

A recent note from Mrs. Brock advises that he is improving slowly so we are hoping for his speedy recovery.

COLLECTING

As we grow older we want fewer and better things. This is true of life in general, including fads. Culture is a result of the artistic evolution of the discerning individual. In collecting minerals one may begin with a pudding stone and be amazed with the history it can be made to reveal, and in after years accept for his cabinet only the most perfect crystal forms, not to study as he once did the stone, but to satisfy his cultivated notions of such things. It is necessary to have a beginning, and the humbler it is the more surely will there be likely to follow something worthy and lasting.

A. C. BATES.

The American Inventor, Jan. 15, 1903.

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VOL. 12 No. 5

The Official Journal ROCKS and MINERALS of the ASSOCIATION

WHOLE No. 70

MINERALS OF THE STRICKLAND QUARRY

By PETER ZODAC

Editor "Rocks and Minerals"

A "Mineralogist's Paradise!" Thus Schairer[1] describes the Strickland quarry near Portland, Conn.; and it is aptly described. But when the writer visited the quarry for the first time, Sunday, November 11, 1934, accompanied by Mr. David Seaman of Pittsburgh, Penn., he was inclined to give the locality a less complimentary name for on arrival it was raining—raining—raining. After it stopped raining it began to pour and how the water did come down! But rain or no rain, after waiting impatiently in the car for an hour or so and still no let-up, the writer could stand it no longer. The quarry just had to be explored. What was a mere ducking anyway compared to a visit to the renowned locality! True, Mr. Seaman had made a number of sallies from the car by holding newspapers over his head and bringing back "specimens" after each trip. Why could not the writer do the same? Unfortunately by this time the newspapers had given out but our collecting bags were still available. Whether the tears of Mother Earth had gone dry or the "dauntless courage" of the two collectors in persisting to wait it out were too much for the good dame, at any rate no sooner had the writer stepped out of the car when the rain ceased and good old Sol came up from oblivion. From then on, the day was ideal for collecting with one exception. The rain had been so intense that the water coated most of the minerals on the dumps with sand, dirt, minute scales of mica, and other material that proved annoying.

(1)—Schairer, John Frank, Ph.D. *The Minerals of Connecticut.* Issued by the State Geological and Natural History Survey, Hartford, Conn. Bulletin 51, 1931, p. 100.

History.

In 1904, F. E. Strickland of Portland, Conn., opened up the present quarry which has been in continuous operation ever since except when closed temporary during slack seasons. Prior to 1904, there had been some small openings made on the site but they were practically insignificant; that probably less than a thousand tons of spar (feldspar) altogether had been removed. Foye[2] states the quarry was originally opened as early as 1840.

Mr. Strickland, who is still the owner, personally operated the quarry for the first two or three years of its existance and then leased it to the Eureka Flint and Spar Co., Inc., of Trenton, N. J., with himself in charge as foreman. He resigned this position about 1920 and since then George Wilkes and later William Wilkes, who is still in charge, were appointed in his place. From 2,000 to 5,000 long tons of feldspar have been shipped yearly from this quarry for many years. Due to improvement in demand, in 1935 it was necessary to put on a night shift. Recent alterations in equipment have made elimination of the night shift possible without any reduction in production. The spar from the Strickland Quarry has a very high reputation for use as a glaze, for which purpose practical-

(2)—Foye, W. G. *Mineral Localities in the Vicinity of Middletown, Connecticut.* The American Mineralogist, Jan., 1922, p. 7.

ly the entire output is used.

Until recently, the lease on the quarry stated that all minerals other than quartz, feldspar and mica, were the property of the owner, Mr. Strickland. As there have not been enough to be of economic value, they were allowed to go to the dump with the waste, which of course has added greatly to the attraction of the quarry for collectors. Due to the rapidly increasing interest in the collecting of minerals, the lease has been altered so that the operator now saves specimen material, with the purpose of selling it to collectors and dealers. But much of it still goes on the dump.

Mr. Strickland recently stated that most of the gem material and rare minerals as uraninite were found at the 30-foot level which is more than 100 feet above the floor of the present workings (140 feet below the surface). Cavities are still found, though small ones, but they contain practically nothing in them of interest except cookeite with perhaps some small cubes of pyrite. During 1935, beryl was becoming more plentiful and in large masses but poorly crystallized. In 1934, at least a ton of spodumene was produced and perhaps a similar amount of lepidolite but there was no market for them.

Regarding mica, before 1926 the production was very small and was only of scrap quality. As the quarry was being worked entirely for feldspar, those parts of the workings rich in mica and lean in spar were not worked. Around 1926, however, it was realized that the mica was of more value than scrap. During that year it was found necessary to remove a quantity of pegmatite that was thought worthless as far as its feldspar content was concerned. A single blast in this area brought down a carload of mica and of quality so high (it had many good sized sheets) its value was readily noted.

Near the surface workings there was practically no sheet mica and although large "books" were quite common they were unfortunately badly ruled and cross-grained and was only of scrap quality. With depth, however, the mica has improved decidedly in both quality and quantity so that since 1927 from 200 to 400 tons of mine-run mica has been produced yearly which was sold in the crude form to mica manufacturers.

In 1933, the Eureka Flint and Spar Company opened up a mica shop, in Portland, where the mineral is split and trimmed into blocks or sheets; in some cases the finished sheets are punched out and cut into various sizes or shapes to meet requirements of electrical manufacturers who are the chief buyers of the product. The mica is used mainly for electrical insulators. The cuttings and poorer grades of mica form scrap which is sold to be made into dry-ground mica and the resulting product is a high grade material used mostly in plastic paint.

The sheet mica varies considerably in size and in quality. A sheet was sent to A CENTURY OF PROGRESS exhibition in Chicago during 1934 that would cut a rectangle 9x18 in. Some of the mica will satisfy the most exacting requirements, such as in condensers for X-ray equipment. But the bulk of the sheet mica is of a slightly stained quality which is best fitted for use in electrical appliances as for flatirons and toasters. The Strickland quarry mica has a peculiar color—a yellow-green-brown mixture—and it can usually be identified by this characteristic color which is not duplicated in any other deposit, except the Schoonmaker's, which is to be expected as it is an adjacent working. One portion of the Strickland quarry, however, produces mica of a rich ruby color and which is very hard—entirely different from the main output.

Although the Strickland was started as a feldspar quarry and is still designated as one since feldspar has been its chief output, nevertheless, it is one of the five largest mica producers in the United States; possibly one of the three largest.

Location

Strickland quarry lies on the west side of Collins Hill, about 2½ miles northeast of Portland. Collins Hill is a heavily wooded mountain, at east it is so around the quarry, and is about 350 feet high.

Furthermore, the locality lies in almost the center of the state, about 22 miles north of Long Island Sound, an arm of the Atlantic Ocean, and about 1½ mile southeast of the Connecticut River which at Portland makes a

sharp bend to the east. The exact site of the quarry is approximately 41°-35'-30" N. Latitude and 72°-35'-15" W. Longitude.

Middletown and Portland are twin cities on the Connecticut River; a bridge connects the two. Middletown, a beautiful city of 25,000 population, is on the west bank and is the home of Wesleyan University whose museum contains a fine collection of minerals that is especially rich in Connecticut localities. Portland is a town of about 4,000 inhabitants.

Route 14 passes over the bridge from Middletown to Portland. With the end of the bridge (in Portland) as a starting point, the directions for reaching the quarry, which the writer takes, are as follows:

0—End of bridge.

1.9 miles, turn right at brownstone monument.

2.5 miles, cross roads. Road to left goes to Glastonbury, East Hartford. Go straight ahead, past cemetary on right; take right fork and go straight ahead for the distant mountain (Collins Hill) which is just 1 mile from the cross roads.

3.5 miles. Base of Collins Hill. Go up hill.

3.7 miles Strickland Quarry.

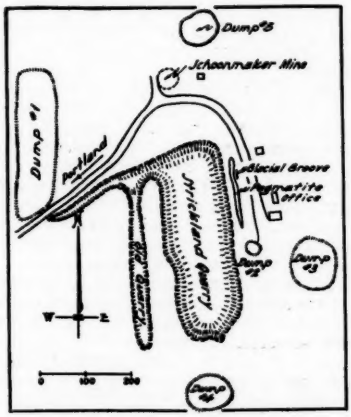
Layout.

There are two workings at the locality separated from each other by about 100 feet. A road passes between them. The larger and older of the two, on the right, is the Strickland quarry, also known as the Eureka quarry, because it is operated by the Eureka Flint and Spar Co., and with which this article shall mainly deal. The small working, lying to the left or north of the road, is an independent one operated as a mine by the A. O. Schoonmaker Company of New York City under the name of the Connecticut Mica & Mining Co., of which Mr. Willard Northrop is superintendent.

The pit of the Strickland quarry is about 300 feet long, 200 feet wide and 140 feet deep. Two dikes are exposed in the pit that are separated by a wall of schist approximately 25 feet thick and dipping about 50 degrees west. When Sterrett[3] examined the quarry in 1914, there were two separate pits here, the schist separating them. The pit on the east of the schist was about 300 feet long, 65 feet wide and 10 to 40 feet deep. The west pit was about 200 feet long 50 feet wide and 25 feet deep. A crosscut led out to the oldest dump at the north end of the west cut and is still in existence. In the intervening years the wall of schist had been removed so as to form one large pit. A pegmatite dike also outcrops to the east of the pit, about 25 feet from the edge, so that at least four dikes are present.

Two tunnels are worked at the bottom of the pit. The one to the north is a large, roughly pear-shaped chamber, about 100 feet deep and 50 or more feet both wide and high. In the center of this chamber, a large pillar of practically pure spar, containing at least 500 tons, has been left to support the roof. The chamber extends to the limit of the property—the boundary being the road at the surface. Mica was plentiful on the west side of this chamber, which is the hanging wall, and the entire area was rich in spar. There are several horses of gray rock showing.

The second tunnel is about 80 to 100 feet long and extends parallel to the main open cut in the opposite direction from the first tunnel. It lies



Sketch Map of the Strickland Quarry.
(modified after Jenk's)

(3)—Sterrett, Douglas B. *Mica Deposits of the United States.* U. S. Geol. Survey, Washington, D. C. Bulletin 740, pp. 65-67. (1923).

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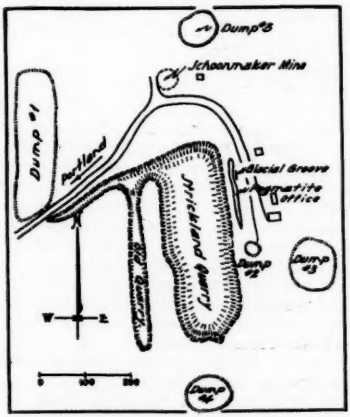

Sketch Map of the Strickland Quarry.
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(3)—Sterrett, Douglas B. *Mica Deposits of the United States.* U. S. Geol. Survey, Washington, D. C. Bulletin 740, pp. 65-67. (1923).

against the hanging wall of the country rock and produces mica of excellent hard quality next to the hanging wall, while the rest of the area is rich in spar. An experimental tunnel is being driven at right angles to this one, more or less toward the old boiler house. This is proceeding through schist and its purpose is to discover the quality of the pegmatite in the two adjacent parallel dikes. It is important to know if the quality, especially of the mica, improves in depth as the main one has. Furthermore, it is not definitely known if there are two distinct dikes or not, because the pegmatite mass is very irregular and difficult to define.

Although called a quarry, most of the operations are now actually being conducted underground and so it makes the Strickland working a mine (a mine is an underground working; a quarry is an open-cut or surface working). Most of the spar and mica come out of the two tunnels, being loaded into tubs at the working faces, moved on tracks to the hoist outside, and then elevated. During the warmer seasons of the year work is also in progress in the quarry proper.

Four waste dumps are present at the locality. The first one is to the left of the road before the pit is reached and is the most extensive of them all but not high; it yields very little material worth collecting. At the extreme end of this dump, one will be rewarded for pushing through the thickly-grown underbrush by an excellent view of the Connecticut River valley and the hills to the west. It is at the remaining three and newer dumps where the best material is now found—at least where we found the best. For convenience, they are numbered 1, 2, 3, and 4 on the sketch map. The best material was collected at dump No. 2, though interesting specimens were also found at No. 3 and No. 4. The specimens come in all sizes so that a hammer is almost unnecessary. The material is of such good quality, so attractive in color and so plentiful, that a visit to the locality is highly recommended. Albite, beryl, lepidolite and tourmaline —these alone will repay a visit unless one is VERY particular. But one has to be careful in collecting as the sharp edges of the quartz will cut a finger easily—as the writer found to his annoyance. It is recommended, therefore, that small bandages and adhesive tape be brought along to take care of such "accidents."

Geology.

The country rock is muscovite-biotite schist, much contorted, called Bolton schist, and at the workings dips 50 degrees west. The quarry is at the junction of the Bolton schist and Glastonbury gneiss.

A few feet from the east edge of the pit is an excellent example of a glacial groove that is worth noting. Unfortunately the writer's notes have been mislaid so that an accurate description cannot be given but if memory serves him right the groove is about 5 feet long, and near or along the contact of pegmatite and schist. See sketch.

According to Sterrett[4], the dike in the east workings contained many pockets ranging from one of small size up to one reported to be 4 feet long, 1½ feet wide, and 1½ feet high. Some of these pockets had yielded tourmaline gems of fine quality and specimen minerals of interest. The gem-bearing pockets were found near the middle and in the south half of the east quarry.

Among the minerals noted by him were: "The pegmatite is coarse grained and contains large bodies of graphic granite, potash feldspar crystals, 2 or 3 feet across..... Among other minerals adjoining and lining the walls of the pockets are coarse, flat albite and cleavelandite crystals, granular lepidolite, rough quartz crystals, greenish muscovite crystals, and a little beryl. Much of the beryl is opaque and yellowish-green, but in one pocket an irregularly shaped fragment of transparent pale salmon-pink beryl was found. It is 2½ inches long and 1 inch thick, with an exceedingly rough honeycombed and drusy surface. It is evidently the remnant of a much larger crystal, most of which has been dissolved, leaving only a part with a rough etched surface. Portions of this would cut into small gems. In some of the pockets there are mossy tuffs or coatings of minute short hairlike tourmaline crystals of dull greenish-gray color. Some of these coatings cover a couple of square inches of the surface of albite

(4)—Sterrett, Douglas B. Work cited. (pp. 66-67).

crystals and make exceedingly delicate, pretty specimens. Gem tourmalines of fine greenish-blue, bluish-green, and nearly grass-green color have been obtained from some of the pockets."

Mineralogy.

In the preparation of this article, a number of trips to the quarry were made, a large number of specimens collected and examined, and many printed reports were looked over. Mr. S. A. Montague, formerly of the Eureka Flint and Spar Company, furnished the writer with many notes and interesting specimens while Mr. A. Martin Hillery of West Hartford, Conn., allowed the writer the privilege of examining four specimens from his collection, of which two, ilmenite and rubellite, were important additions to the list of minerals. Furthermore, the writer has quoted freely from two important reports—**The Minerals of Connecticut,** by J. F. Schairer and **Pegmatites at Collins Hill, Portland, Conn.,** by William F. Jenks, in order to bring the list up to date. In the list, these two reports are designated by page number only. The minerals found at the Strickland quarry are as follows:

—Albite:—This is very common and is present in excellent specimens varying from pure white to pale bluish-white and occurs in two forms—massive and platy (cleavelandite). In the massive form it can be easily recognized by its thin laminae, resembling striations, and which are glistening in reflected light and which often radiate from common centers. Albite is especially associated with spodumene, the two forming a distinct contact whereas when associated with quartz or tourmaline they penetrate one another. If the massive form of albite does not show laminations, it does show striations.

Albite is also present in granular form and white in color and in a crystallized form, white in color, on massive albite; the latter is often associated with small green tourmaline crystals.

A specimen of bluish albite was found showing bent laminae as if the mineral had been squeezed or compressed. It was associated with smoky quartz.

Masses of platy albite crystals have recently been found lining a large cavity. Another large cavity recently uncovered contained some beautiful specimens similar in form to these albite crystals, but a light blue in color (cleavelandite). The remainder of these cavities apparently contained mostly quartz crystals, of all sizes, in clear, milky and smoky varieties.

A peculiar type of albite which has puzzled many a collector who ran across it is colored pale yellow-brown. It frequently appears to be an alteration of cleavelandite and even occurs as drusy coatings in its cavities. Jenks states the mineral is a potash—bearing albite and that it replaces spodumene, microcline, and cleavelandite, commonly as irregular veinlets but also as drusy coatings in cavities. (p. 194).

Allanite:—Schairer states it is found as long, acicular crystals in pegmatite (p. 31).

Amblygonite:—Reported by Jenks to have been found here. (p. 183).

Apatite:—A minute gemmy purple crystal in albite was found. Also occurs massive, green in color, associated with massive garnet on albite. Apatite does not seem to be plentiful

Schairer says:—"In perfect pink, pale green or white crystals in cavities in pegmatite—also in large rough crystals and masses of deep olive green **manganapatite."** (p. 33).

Jenks states that the dark gray or gray-green massive variety which is fairly plentiful is manganiferous (p. 192). He also observed zoning in one crystal; this showing a pale-green color within, grading to light purple on the outside. (p. 193).

Arsenopyrite:—See sphalerite.

Autunite:—Schairer says: "Found as beautiful lemon-yellow scales or tiny plates coating feldspar, uraninite or other minerals in pegmatite dikes." (p. 34).

Jenks says:—"Autunite also is very rare. It occurs as yellow, usually scaly fracture coatings on microcline, albite, quartz, muscovite and garnet, and may represent a weathering product." (p. 196).

Bertrandite:—None were noted by the writer but Dr. F. H. Pough[5] found

(5)—**Pough, F. H. The American Mineralogist, Dec. 1936, Vol. 21, No. 12, p. 816. (Report of Members of the New York Mineralogical Club upon their collecting experiences during the past summer).**

masses of small white tabular crystals of bertrandite on some loose fragments of very deeply etched beryl. A later visit by Dr. Pough yielded more bertrandite; this time in more prismatic crystals in vugs in feldspar.

Beryl:—This is rather common and is found chiefly of a blueish-green color, partly gemmy crystals, and makes very attractive specimens. It can be picked up generally in pure masses (broken crystals) but now and then is found associated with quartz, albite, muscovite, lepidolite, and black tourmaline. A number of small crystal masses were found in which were imbedded minute crystals of greenish tourmalines, garnets and muscovite; but the crystals were of poor quality. One pale brownish crystal mass, of fair quality, had imbedded in it a small smoky quartz crystal, about ½ inch in diameter and of good quality; thin films of pyrite coat one face of the quartz crystal.

Opaque pink beryl is also known from here but is not common. This grades into the transparent variety **(morganite).**

Schairer says: "Connecticut localities are famous for their fine beryl crystals and the large museums have preserved many fine specimens. Famous localities are....Portland..... A few stones (morganite) have been cut from the pink beryl of Portland.—Caesium beryl is also found at Portland." (p.35).

Jenks has found beryl in zoned crystals; also noted that the colors of beryl range from green (or yellow green where shattered) through yellow and white to pink. (p. 191).

Beryl var. Aquamarine. This was noted as narrow, gemmy zones in bluish-green beryl. Mr. Strickland is said to have found a shattered transparent beryl of pale aquamarine color which cut a number of small gems.[6]

Biotite:—One interesting specimen penetrating muscovite, on albite, was collected. Associated with the albite was smoky quartz. Small biotite plates, fair in quality, were found imbedded in large plates of muscovite. Minute flakes of biotite are disseminated in muscovite sheets.

Large black plates, of good quality, and imbedded in muscovite, were also found. One specimen of muscovite, 3x4 inches in size, had a biotite crystal 1¾x3 inches in size, imbedded in it in such a way that the muscovite was present only as narrow strips on the biotite's two long edges.

In some parts of the quarry biotite is very plentiful. The south end of the open part of the quarry had to be abandoned because there was so much biotite in the spar. The old dump (No. 1) contains a lot of biotite.

Bismuthinite:—Schairer says it is found very rarely at Portland. (p. 37).

Bismutite:—Schairer reports it as found rarely as an alteration product of other bismuth minerals, incrusting them and filling cracks. (p. 37).

Calcite:—"In good crystals (nail head calcite) at the Strickland quarry." Schairer (p. 38).

A nail head calcite crystal pale yellow to colorless, was observed in a cavity in one specimen. Jenks, (p. 195).

Chalcopyrite:—"Quartz veins up to a foot in thickness cut the Bolton schist in the vicinity of the pegmatites. These are made up dominantly of glassy or white, granular quartz and contains small amounts of pyrrhotite and chalcopyrite." Jenks (p. 187). See also sphalerite.

On dump No. 4 chalcopyrite was noted as small masses in smoky quartz veins in schist associated with pyrite and pyrrhotite.

Chlorite:—See sphalerite.

Columbite:—Found in thin tabular black crystals in albite; the columbite on the surface was tarnished, showing a bluish tinge on the black crystal. Only one specimen was found by the writer but well-defined crystals occur.

Found in large, well-formed crystals. Schairer (p. 42).

Jenks noted columbite to have three general habits:—1, massive; 2, coarse, irregular crystals; and 3, minute, highly perfect crystals. Some of the massive material is zoned from black on the inside to dark brown on the rim, he further noted. (p. 194).

Cookeite:—Found as minute yellowish scales on smoky quartz and as small tufts in cavities. It is quite plentiful and usually forms the lining of the small cavities.

Cyanite:—Occurs in mica schist near the quarry. Schairer (p. 45).

(6)—Shannon, Earl V. *Strickland's Quarry, Portland, Connecticut.* The American Mineralogist, Mar. 1920, Vol. 5, No. 3, p. 51.

Dickinsonite: — Schairer[7] says: "Very rare and has been found as small, green micaceous flakes with small masses of lithiophilite on spodumene."

Fluorite:—Small purple cubic crystals on smoky quartz and on white albite; a minutely thin vein in smoky quartz, and as massive in albite were the chief occurrences noted. A large purple fluorite crystal, with poor terminations but of good quality, was found imbedded in a cavity in albite; small poor crystals were found in cavities in granular microcline.

Found in good green and purple crystals. Schairer (p. 47).

Its color ranges from purple through pale blue and green to colorless and at times is covered with small crystals of albite. Jenks (p. 195).

Galena:—"Galena is very rare at the Collins Hill pegmatites, the only occurrence noted being a small crystal perched on the end of one of the latest tourmalines." Jenks (p. 196).

Garnet var. Almandite: — Garnets are fairly plentiful perhaps the best of which is a little gemmy crystal imbedded in muscovite. Small gemmy crystals in smoky quartz and in white albite were also found. A flattened crystal, about ½ inch in length, was found in biotite; on the crystal was a thin film of pyrite. Massive garnet associated with massive green apatite on albite was also found.

In one instance, a small broken garnet crystal imbedded in albite is bi-colored; about ¾ of it is pale red, the remaining ¼ being greenish-white.

Small poor crystals of garnet were also noted imbedded in beryl. A large distorted garnet crystal, 2½x1 inches, imbedded in an aggregate of smoky quartz, muscovite, and albite, was found September 8, 1935. In the process of trimming down the specimen, the crystal was cracked, otherwise it would be of fair quality. Minute flattened gemmy crystals, of good quality, occur imbedded in muscovite.

Graphite:—"It has been found at the Strickland quarry, Portland, near the contact between the Bolton schist and the pegmatite." Schairer, p. 110.

Hureaulite:—Another rare mineral. It is deep orange-red in color and occurs in small quantities with lithiophilite. Schairer.[8]

Ilmenite:—Black plates along contact of white albite and grayish microcline. It is a good specimen.

Iolite:—Foye[9] reported the mineral as having been found within the Bolton schist a few centimeters from its contact with the pegmatite.

Kaolinite:—Reported by Foye. Evidently an alteration product of one of the feldspars, possibly albite. (p. 7).

Lepidolite:—This is a lithium bearing mica with a lilac color and is very common, attractive, and occurs in large masses. It is generally scaly-granular but also occurs in large plates and crystals. It is chiefly associated with smoky quartz but is also found with microcline, blue albite and beryl.

Limonite:—This is practically absent and what was found occurred as brownish stains on white albite. The practical absence of limonite accounts for the attractiveness of the minerals found here.

Lithiophilite: — Schairer says that lithiophilite and some rare phosphates are found sparingly at the Strickland quarry (p. 52). He further states that in studying the mineralogy and paragenesis of the pegmatite at the Strickland quarry, that several lithium minerals associated with the manganese phosphates were found. The minerals occurring together were spodumene, lepidolite, manganapatite, lithiophilite, dickinsonite, and hureaulite in albite and quartz. And that very small amounts of dickinsonite and hureaulite were found with the lithiophilite which is itself not abundant. Furthermore, that a large specimen of lithiophilite was placed at his disposal for chemical study by Prof. Foye of Wesleyan University. The specimen consisted of a large mass of light orange-colored lithiophilite without crystal form, in platy albite with muscovite, quartz and a very little dickinsonite as accessory minerals.[10]

(7)—Schairer, J. F. *Lithiophilite and other rare phosphates from Portland, Conn.* American Mineralogist, April, 1926, pp. 101-104.

(8)—Schairer, J. F. *Lithiophilite and other rare phosphates from Portland, Conn.* American Mineralogist, April, 1926, pp. 101-104.

(9)—Foye, W. G. Work cited p. 7.

(10)—Schairer, J. F. Lithiophilite and other rare phosphates from Portland, Conn. American Mineralogist, April, 1926,

Lithiophilite, brown to dark brown masses, associated with platy white albite and massive smoky quartz, has been found quite frequently and in large amounts.

Microcline:—(also known as spar) —Pale buff in color and associated with quartz and tourmaline. It is present in large amounts and is the chief feldspar quarried as albite appears to be rejected or little used. A granular variety of microcline is also present and often it occurs as small patches in albite. At times the granular microcline is cellular and in its minute cavities are many tiny crystals of quartz (rock crystals).

Microlite:—None found by the writer but Schairer says excellent crystals are found here. (p. 54). Pough[11] also reports collecting two crystals of microlite in a matrix of late potash-bearing albite which replaces the cleavelandite.

Molybdenite: — Occurs rarely as small flakes of fair quality in an aggregate of white granular albite and a yellowish-brown mica. The mica occurs as a mass of small flakes and the molybdenite is imbedded in these flakes. Found on dump No. 4.

Mr. Seaman reported he found molybdenite within a broken specimen of spodumene that was collected on the trip.[12]

Monazite:—Schairer reports it as occurring in small crystals. (p. 55).

Montmorillonite: — Occurs very rarely as a pinkish clay in cavities in smoky quartz and in spodumene.

Muscovite:—This is the commonest mica present and occurs in large sheets. It is chiefly of the white variety associated with quartz but a green variety is also present though in small amounts. One specimen of the white variety, in albite, penetrates biotite and makes an interesting specimen. Muscovite is also present as small crystals in albite, beryl, quartz, and in microcline.

Schairer observed a sheet of muscovite at the Strickland quarry that was 19 inches by 42 inches, clear and almost flawless. (p. 89).

Muscovite var. Sericite:—This occurs as small pearly scales of a faint green color on quartz and albite.

(11)—Pough, F. H. Work cited, p. 816.

(12)—Seaman, David M. Personal communication received Feb. 28, 1935.

Orthoclase: — "Very large rough crystals of orthoclase are found at Strickland quarry, Portland. Small, clear, perfect crystals are also found in cavities." Schairer, p. 18.

Pickeringite: — Schairer says: — "Found under ledges and in protected places on the mica schist or wall rock of the Strickland quarry, Portland. Still forming here. Probably results from the alteration of pyrite and the solvent effect of the sulphuric acid produced on the biotite and other minerals of the mica schist." (p. 57).

Pinite:—Jenks states it occurs as a dull green mineral, having the cleavage and crystal form of spodumene and may be a pseudomorph after it. (p. 195).

Pyrite:—This is rather common as quite a number of specimens were found. One occurs as a thin film on a flattened garnet crystal imbedded in biotite. Minute grains have also been found imbedded in black tourmaline and in white albite. Also occurs as thin films on smoky quartz and on albite and apparently denotes slickenslided surfaces. Also noted as minute films on one face of a small smoky quartz crystal on beryl. Found also as minute cubes in cavities in granular, pale brownish albite and as small cubes in white cleavelandite. Dainty little minute cubes of good quality are common in cavities in albite and in granular microcline.

Pyrite has furthermore been noted as small masses in smoky quartz veins in mica schist (Bolton) associated with chalcopyrite and pyrrhotite.

Pyrrhotite:—Occurs as small masses in smoky quartz veins in mica schist (Bolton) associated with chalcopyrite and pyrite.

Quartz, var. Citrine: — Schairer states that beautiful gem stones have been cut from the golden yellow quartz (citrine) found at Portland. p. 61).

Quartz, var. Milky:—Recently a number of nice crystals were found in a large cavity. (See albite).

Quartz, var. Rock Crystal:—Minute, dainty little crystals in small pockets and vugs in albite have been found.

Quartz, var. Rose:—Schairer reports it as occurring at Portland. (p. 61).

Quartz, var. Smoky:—This is a very common mineral and occurs associated with tourmaline, lepidolite, muscovite, albite, and microcline. A good part of the smoky quartz is translucent to transparent; some grade into the dense black variety known as **Morion** which was found associated with white albite. In a number of instances smoky quartz has been found showing a peculiar irregular surface, resembling a flight of steps on a miniature scale, which on first glance appears to resemble the crystal surface of some spodumene. This peculiar surface had the writer puzzled as he could not account for it. By a fortunate chance a specimen of crystallized muscovite on massive quartz had been collected and the crystallized form of the muscovite furnished the clue for the strange surface on the quartz. For the muscovite crystals, made up of minutely thin plates, had each plate set back slightly from the one below it, forming the minutely step-like structure and these coming in contact with the smoky quartz had caused the quartz to assume a similar step-like appearance, mentioned above, at the time when the minerals were solidifying from their magma. From this it can be assumed that the muscovite had formed before that of the quartz in the pegmatite and that the quartz had flowed in covering the muscovite-quartz contact and thus its contact surface resembled that of the muscovite.

One specimen of smoky quartz crystals in parallel group on albite was found but the crystals were not of good quality.

Smoky quartz also occurs massive in mica schist.

A number of large, loose crystals, some at least one foot long, were found September 8, 1935, by Messrs. R. Emmet Doherty of Peekskill, and Henry Thurston of Montrose, N. Y. The crystals were of good quality but partly stained by brown limonite; some of the crystals were coated by a secondary growth of minute drusy quartz crystals, also stained brown by limonite. The surfaces of these large crystals resembled sandpaper in texture. One pale smoky crystal, unfortunately broken, 3 inches long, 2 inches wide, and 1 inch thick, whose edges were stained by limonite, contained a large number of white, slender inclusions which were assumed to be albite. The inclusions took all forms—one resembled a miniature mineral hammer; others formed letters of the alphabet as K, V, X, M, T, U, L.

An apparently flattened smoky quartz crystal, 3 inches long and 1 inch wide, was found embedded in crystallized white albite (cleavelandite). The crystal was of good quality but the surface of the cleavelandite was stained brown by limonite.

A massive, gemmy loose specimen of good quality of smoky quartz was found by the writer September 8, 1935. A small, doubly terminated crystal 1 inch in diameter with apparently no prisms, was found the same day imbedded in a pale brownish beryl. The crystal was of good quality and one face was coated with minute films of pyrite.

About May 15, 1936, two large loose crystals of good quality, weighing about 125 pounds each, were found in a large cavity.

Schairer states that beautiful gem stones have been cut from the smoky quartz, often called **Cairngorm** stone, found in Portland. (p. 61).

Rhodochrosite:—Jenks found the mineral in but a single specimen as a cavity filling. (p. 196).

Rhodonite:—Massive rhodonite intergrown with albite and lepidolite was found some years ago. Foye[13] describes the occurrence as follows: "In working a narrow dike near the entrance to this quarry. M. F. E. Strickland came upon a pocket lined with the usual albite and lepidolite. The massive background behind the loose filling of the pocket was composed of a pink mineral which was at first thought to be a peculiar type of feldspar. Mr. Strickland saved a few bits from the wall of the pocket and gave them to Professor Rice and the writer during a recent visit. Details of the occurrence, other than those already stated, cannot be given, as the pocket was destroyed before our arrival."

(13)—**Foye, Wilbur G. *A New Occurence of Rhodonite.* The American Mineralogist, Oct., 1919, Vol. 4, No. 10, p. 125.**

The pink mineral was rhodonite and a specimen is on exhibition in the museum of Wesleyan University, Middletown, Conn.

Sphalerite: — A small mass, ½x¼ inches in size, brownish in color and fair in quality, was found by the writer September 15, 1935, when the locality was visited with Raymond Conover of Kyserike, N. Y. The sphalerite was imbedded in smoky quartz.

Jenks says the mineral occurs most commonly as brownish crystals in cavities. One specimen of a different type is worthy of note because of its marked resemblance to the mineralization of some hypothermal ore deposits. A matrix dominantly of coarse garnet is filled with irregular masses of black sphalerite, chalcopyrite, and arsenopyrite. In addition the garnet is replaced by abundant dark green chlorite. (p. 196).

Spodumene:—This too is very common and is found in lathe-shaped masses of two colors, white and lilac **(kunzite).** Spodumene is especially associated with albite and the contact between the two is sharp and distinct. It is also associated with smoky quartz and its contact is sharp and distinct.

Though spodumene occurs here in large lathe-shaped crystals and masses often two feet in length what are found are simply pieces of them but many inches in length. Judging from the number of specimens collected, the crystals had crystallized out in pairs and forming a V-shaped angle between them; the filling between such crystals is generally albite. Now and then one of the crystals would be common spodumene (white) while the other was kunzite (lilac).

Staurolite:—Schairer reports it as being common with garnet in the Bolton schist at Portland. (p. 65).

Torbernite:—Schairer says it occurs as beautiful deep emerald-green micaceous flakes coating quartz or other minerals, especially uraninite and allanite. p. 67).

Tourmaline, var. Black:—This likewise is very common and is the chief tourmaline found here. It occurs in large irregular masses up to a foot in diameter; and as large crystals which grade down to tiny ones, and all imbedded chiefly in smoky quartz.

A number of small black masses of tourmaline were noted each with a thin quartz vein completely penetrating them; indeed large masses when on quartz, the quartz invariably penetrates the masses completely as thin veins.

Tourmaline has also been collected showing an intergrowth with smoky quartz in relation that suggest the intergrowth of quartz and feldspar in a graphic granite. Black tourmaline crystals were also noted in beryl.

In a number of instances, black tourmaline crystals were imbedded along the contacts of small muscovite crystals that lie at an angle and as the edges of muscovite crystals are generally dark, the tourmaline crystals imbedded along such edges can easily pass unnoticed.

One small specimen of smoky quartz was found in contact with tourmaline schist; the schist had minutely small black tourmaline crystals, hence it became a tourmaline schist.

Large crystals of black tourmaline are sometimes found imbedded in cleavelandite but what were found were generally broken, otherwise the crystals were of good quality.

One broken crystal of black tourmaline, 2½ inches long and 1¼ inches wide, had a ⅛ inch vein of muscovite running through its entire length; the specimen was of good quality.

A number of small, slender and bent, black crystals of tourmaline, of good quality, were found imbedded in greenish muscovite. The tourmaline appears to be a mass of acicular, twisted crystals.

Tourmaline, var. Green: — Tourmaline found here by the writer varies from green to greenish-black to deep black; the green always was noted as small crystals, oftentimes a tourmaline crystal had one termination green, while its main body or mass was black or greenish-black. The greenish crystals are often finely striated lengthwise. Small gemmy green crystals associated with crystallized albite on massive albite was also noted.

The finest green gemmy tourmalines were found in little pockets in white albite. In one instance, muscovite covered the opening of a pocket leaving a small crack; with the point of a knife, the muscovite was removed exposing three dainty little green crystals of tourmaline.

One specimen of white albite and smoky quartz had imbedded in it a 1-inch green tourmaline crystal; a black tourmaline crystal of the same size and parallel with it was in contact with it but between the contact of the two crystals was a pale brownish thin filling of unknown identity—perhaps it was quartz. Both tourmalines had their terminations missing.

Schairer says:—"Connecticut rivals Maine and California in the excellence of the gem tourmaline it has produced. A famous locality for gem tourmaline is the Strickland quarry, Portland. The author has seen a deep indigo-blue crystal from this locality about six inches long and over an inch across, clear and flawless! Green crystals were especially common at Portland. The gem tourmalines were found lining cavities or in the soft clay (montmorillonite) in the bottom of the cavities. Asbestiform tourmaline is found in Connecticut only at the Strickland quarry. It consists of olive green fibers or hairs matted like asbestos." ((p. 68).

Tourmaline, var. Rubellite: — None found by the writer but Mr. A. Martin Hillery of West Hartford, Conn., supplied him with a nice specimen. It formed the variety known as "watermelon tourmaline", pink inside and green outside. The specimen consisted of large irregular shaped crystal masses of watermelon tourmaline in an a~~regate of albite, smoky quartz and lepidolite.

Shannon[14] found a tourmaline crystal at the quarry which was purplish at the base, rubellite pink in the central portion and green in the upper third.

Tourmaline found at the Strickland quarry varies in color from black to blue to green to purplish to pinkish to gray to almost colorless.

Uraninite: — Schairer states that good octahedrons and dodecahedrons of uraninite have been found at the Strickland quarry (p. 14).

Jenks mentions it as occurring in euhedral crystals. (p. 194).

Shannon[15] reports that uraninite has been found in beautifully sharp octahedral crystals thirty-five of which were given to Wesleyan University.

Montague[16] advises that as far as he knows only a single find of uraninite has been made at the quarry. This was at the level of about 30 feet. Practically all the crystals found are in the Wesleyan University Museum, which museum has many other fine specimens from Strickland quarry.

Xenotime: — Schairer states it is rarely found as very perfect crystals at the pegmatite quarry of Portland. (p.70).

Zircon:—Jenks reports it as having been found here. (p.196).

(14)—Shannon, Earl V. Work cited p. 53.
(15)—Shannon, Earl V. Work cited p. 52.
(16)—Montague, S. A. (Personal communication.

SCHOONMAKER'S QUARRY

The Schoonmaker's quarry, or mine as it really should be called, was opened up in July, 1933, by the A. O. Schoonmaker Company of New York City under the name of the Connecticut Mica and Mining Co., of which Mr. Willard Northrop is superintendent. The company specializes in insulating material and its chief interest in the deposit is in the mica that occurs here in large books. The deposit is opened by a vertical shaft 85 feet deep, which is about 50 feet in diameter at the top and tapering down to about 30 feet at the bottom. A tunnel leads off to the east, at the bottom, for about 25 feet to tap the pegmatite dike and then a gallery leads off to the north. At the time of the writer's first visit, November 11, 1934, the gallery was in about 50 feet but it is much longer now. The gallery cannot run south more than a few feet as it begins practically at the property line. It is about 30x30 ft. in cross-section, is electrically lighted, and is kept dry by having the water drain to the shaft where it is pumped out by an electric pump. The material as mined is shovelled into a small mine car, pushed out over a small track to the shaft where it is dumped into a small bucket and hoisted to the top. One book of mica was seen on the car at the shaft bottom that was easily 3x3 feet by 6 inches in thickness. The feldspar mined is not thrown away but sold as a by-product. The miners enter and leave the gallery by means of a wooden stairway which is fastened to the west and north walls of the shaft. Aside from the timber in the stairway no other is used in the shaft nor in the gallery. A screen barricade has been built around the top of the shaft

to prevent rocks and other loose material from falling down into it.

Only one waste dump but a large one is at the locality. This is dump No. 5 and is worth more than a cursory examination. Sove very fine minerals have been found on it.

Mineralogy.

The minerals of the Schoonmaker's quarry are naturally similar to those found at the adjacent workings and may in time duplicate them. Those found by the writer are as follows:

Albite:—This is very common, of good quality, and what has been seen was of one color—white—but it occurs in platy and in a granular form; often the two forms are present in the same specimen associated with smoky quartz, muscovite, tourmaline, lepidolite and beryl. One small thin laminae of the platy variety **(cleavelandite),** was found, containing a number of green inclusions which were believed to be flattened crystals of tourmaline but they were too indistinct for identification. The laminae were so thin that the inclusions shown through. One good crystallized specimen of cleavelandite was also collected, and which was associated with smoky quartz. Imbedded in the quartz were dainty little pyrite cubes.

Aragonite:—Found as a brownish-gray (stained by limonite) coating on smoky quartz.

Beryl:—This does not appear to be common but with search it can be found. Those collected were of a yellowish-green color but not of as good a quality as is found in the Strickland quarry. What were collected were simply pieces of large crystals. One small fragment of the bluish-green variety was also found; also a rough crystal of the yellowish-green variety associated with albite. Grayish-green beryl of good quality have been noted as broken crystals associated with albite, muscovite and smoky quartz; remnants of small black tourmaline crystals are often imbedded in this beryl.

Beryl var. Aquamarine:—The largest and finest aquamarine the writer ever found anywhere was picked up June 23, 1936, when the locality was visited with Dr. John R. Evers and R. Emmet Doherty. The specimen was of good quality and color, weighed about 3 pounds, and was presented to Dr. Evers.

Biotite:—This variety of mica occurs in limited amounts as small black crystals as inclusions in muscovite. It also is the chief constituent of the mica schist associated with the pegmatite.

Fluorite:—One nice specimen as a purple crust on white aragonite with pyrite all of which in turn coat albite was found. Fluorite also was noted as small poor crystals in cavities in smoky quartz; and as thin films with muscovite on quartz. Some good specimens of crystallized fluorite, and as small cubes, both of good quality and both imbedded in cleavelandite were found. The fluorite was dark purple in color, some appeared almost bluish; some contained minute cubes of pyrite.

Garnet, var. Almandite: — Small gemmy crystals of a reddish-pink color in albite and in quartz were noted but were not of good quality. Crystals were also noted in muscovite, in black tourmaline and in mica schist.

Lepidolite:—This lilac colored lithium mica was associated with albite and smoky quartz but did not appear to be as plentiful as at the adjacent quarry. Large sheets, 2x3 inches in size, of good quality on smoky quartz were collected. The sheets were bi-colored. The parts attached to the quartz were dark-lavender; the exposed parts were grayish.

Limonite: — Occurs sparingly as brown stains, especially on quartz.

Microcline:—As noted before, this feldspar is mined and sold as a by-product. It occurs in large flesh-colored masses and good specimens may be had for a collection. One specimen, almost white in color, of good quality and associated with smoky quartz, was collected.

Muscovite:—This is the chief mica present and the mineral especially mined. It occurs in "books" of enormous size. Fine crystals are common, associated with albite and smoky quartz. Much of the muscovite has a greenish cast to it. Some of the greenish muscovite crystals are so transparent and pearly on their edges that when seen in pockets they resemble anything but muscovite; they look more like green gemmy

apatites or some other minerals — never muscovite.

Muscovite, var. Sericite:—This is an altered muscovite and is present as yellowish-gray flakes on albite.

Pyrite: — Dainty little cubes on smoky quartz were collected. A number of pyritohedrons also on smoky quartz were noted. Pyrite is also present as small grains in lepidolite; as thin films on mica schist and on albite; and as small masses with fluorite on aragonite which in turn coats albite. Dainty little cubes of good quality occur disseminated in cleavelandite; some of the cubes intersect one another. Small cubes, poor in quality, have been found in black tourmaline.

Quartz, var. Rock Crystal: — Two small crystals in a small cavity in albite were found but they were not of any consequence.

Quartz, var. Smoky:—This is very common and is present in massive form of good quality associated with albite, muscovite, and black tourmaline.

Tourmaline, var. Black:—Very common, in good specimens, and especially associated with smoky quartz but distinct crystals were not seen; minute masses occur in lepidolite. One small flattened crystal ¼ inch cross-section, and of good quality, was found imbedded in muscovite; a small but good crystal was found imbedded in an aggregate of cleavelandite, muscovite and smoky quartz.

According to the large amount of black tourmaline noticed here and at the neighboring Strickland quarry, it would indicate that the mineral occurred massive rather than in crystal form. Nevertheless it was assumed that the pieces of black tourmaline present were simply parts of large crystals which had become broken during quarrying operations as some showed crystal faces. But one specimen of smoky quartz was found that was approximately 2x3 inches in size and which had through its center a minutely thin vein of black tourmaline resembling a thin plate of ilmenite. This might possibly be a flattened crystal of tourmaline forming a thin plate 2x3 inches by about 1-64 of an inch thick or it may be an ordinary vein mineral which would indicate that larger veins were also present and thus account for the large masses of tourmaline present. At two extremities of this particular specimen (tourmaline vein), the black tourmaline is replaced by green tourmaline—also in vein form and of the same thinness.

Tourmaline, var. Green: — Very common as small gemmy crystals in muscovite though it also occurs in albite and in smoky quartz.

It was noticed that though black tourmaline was present as chunky masses, the green tourmaline was present as long, slender, tapering crystals which seldom reached 2 inches in length and often radiating. Sometimes the green crystals crossed each other; at times the crystals were so deeply striated that they appeared to be either fibrous or else composed of a bundle of needle-like crystals. They were generally always in muscovite; one green crystal was noted in lepidolite. One green crystal on quartz had part of the crystal darker than the rest.

Tourmaline, var. Rubellite: — One small broken pink crystal, poor in quality, was found associated with albite.

CONCLUSION

The writer heartily endorses the Strickland quarry as a locality for good mineral specimens. But if possible more than one trip should be made for it seems that on each additional visit better specimens, and often new ones, are found. And the locality is not too far for those residing within a radius of 100 miles.

It is the only large operation still being worked in Connecticut, which means that new fresh specimens can always be obtained, instead of having to pick over old weathered dumps that hundreds before you have already been over, as is the case with discontinued operations.

The distance from Peekskill, N. Y., to the locality is 101.2 miles. On the writer's first visit, with Mr. David Seaman, we left Peekskill 8:00 a. m., and arrived at the quarry 11:30 a. m.—which was not so bad when one considers we had to watch for signs and even inquire our way and that the last 20 miles was made in a driving rainstorm. All in all it was a trip well-worth while.

It might not be amiss to advise that in the little city of Portland are a number of extensive red sandstone quarries that might be worth a visit. These are along the Connecticut River and easily reached. We had time to visit only one and found it to be about 500 feet long, 300 feet wide and 100 feet deep to top of water (at the eastern end) and were told it was at least 100 feet below the top of water. This particular quarry is about 300 feet east of the river, about 1,000 feet north of the main road and alongside a narrow dirt road that begins about 500 feet east of the bridge. The quarry was abandoned and whether the rest were also or simply shut down for the time being we could not learn; nevertheless huge stocks of quarried stone awaiting shipment were all around.

ACKNOWLEDGMENTS

The grateful thanks of the writer are extended to Messrs. David Seaman, R. Emmet Doherty, Carl Klein, John R. Evers and Raymond Conover who very courteously invited him to accompany them on their trips to the quarries, thus paving the way for this article; to Mr. Seth Fisk, formerly superintendent of the Schoonmaker's mine, for permission to enter the shaft and gallery and for other courtesies; to Mr. A. Martin Hillery for the loan of six specimens for examination; to Mr. F. E. Strickland, owner of the Strickland quarry, for valuable information on the history of the quarry which he gave graciously furnished Mr. S. A. Montague who in turn forwarded it to the writer; and especially to Mr. Montague, formerly of the Eureka Flint and Spar Co., whose very cordial interest and hearty cooperation in supplying notes and specimens was most inspiring and which insured the success of this article. To all these kind friends, the writer is deeply indebted.

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WESLEYAN MUSEUM TO BE OPEN FOR ASSOCATION MEMBERS

Through the kindness of Dr. Joe Webb Peoples of the Department of Geology, Wesleyan University, Middletown, Conn., the University Museum will be opened at the following hours for the convenience of members of the Rocks and Minerals Association:

Saturday, May 22nd—9:00 a. m. to 1:00 p. m.; 2:00 to 5:00 p. m.

Sunday, May 23rd—9:00 to 11:00 a. m.

Monday, May 24th—9:00 a. m. to 1:00 p. m.; 2:00 to 5:00 p. m.

The museum has on display many fine minerals from the Strickland Quarry and from a host of other localities as well.

SOME MINERAL LOCALITIES NEAR PORTLAND, CONN.

It may be that some of our members who will attend the annual outing at the Strickland Quarry, Portland, Conn., on May 23, will be interested in visiting some other nearby mineral localities. Members of the New Britain Mineral Club have offered to be on hand to act as guides to those who may want to try their luck at nearby places. On Saturday, May 22, information can be obtained from S. A. Montague, at the shop of the Huse-Liberty Mica Co., 668 Main Street, Portland, Conn. Some of the other places of interest are:

Middletown Lead-silver mine — specimens of galena and sphalerite, rarely anglesite, and others. Easily accessible. About six miles from Strickland Quarry.

Penfield Feldspar Quarry. A very old working. Columbite, beryl and good mica Xls have been found here. About two miles from the Strickland.

Rock Landing Quarry. This is in Haddam Neck, about ten miles from the Strickland. Autunite. Columbite, other pegmatite minerals.

Gillette Quarry. Also, in Haddam Neck, about 12 miles from Strickland. This is the famous old gem tourmaline quarry, but pickings are very poor now.

Slocum, Quarry, Easthampton, about fifteen miles from Strickland, but near Gillette and Rock Landing Quarries. Very good small Xls of gold (caesium) beryl and good small columbite Xls. Half mile walk from auto road.

Cobalt mine, Great Hill, Cobalt. Three miles from Strickland. Very old, and dumps almost obliterated by growth and weathering.

Howe Quarry, S. Glastonbury. The largest feldspar working in Connecticut. Now inactive. Very large dumps, many pegmatite minerals have been found here, but has been well picked over.

S. A. M.

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The Fluorescence of Minerals. By Chester B. Slawson, with plate of 24 natural fluorescent colors by photo	.50	05c
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Fossil Penn. Coal Flora of Northen Ill. By A. C. Noe beautifully illustrated	1.00	...
Field Book of Common Rocks and Minerals. By Prof. Fred B. Loomis	3.50	15c
Gold Prospecting. (2nd Edition, By Stephen Jacy	1.60	15c

THE LAVA CASTS FOREST OF OREGON

By E. C. ALFORD

Gapping of the earth's crust in fissures a mile in length; pouring from these, sheets of liquid rock, forming tongues of fire in its descent into radial valleys; creaking and crashing of broken trunks and branches of giant pines; grinding of half-cooled lava, heaving and curling within itself; explosions of imprisoned Vapor and gases; licking of flames from a holocaust of an engulfed forest; heavens darkened with pitch smoke as from a burning city—such is the picture not difficult to visualize, now indelibly printed in the congealed streams of what was a living reality in the volcanic activity within the Paulina district possibly not more than two thousand years ago.

This rare treasure of America's geologic history may be easily visited by the passing tourist and more carefully studied by the patient student of Nature.

The entrance to the field is within an hour's drive from the city of Bend. Between mile posts 155 and 156 on The Dalles-California Highway south of the city, and less than a mile south of the Lava River Cave State Park, a bold sign indicates the road leading southeastward to the entrance nine miles distant. On a contour map it may be located within Section 28, 29, T 20 S, R 12 E.

The rarity of this field consists of innumerable casts formed of lava around the trees of a pine forest. This very recent lava flow covers several square miles, spread over the floor of previous ones of much greater age. "Sunken gardens" on these older floors where the lava has failed to reach are surrounded with verticle walls to the height of twenty feet.

At the time of this last eruption much of the area was covered with a dense pine forest. Into this forest the molten lava plunged, engulfing it to a depth of twenty feet. Some of the trees were able to witstand the impact of the flow which splashed upward for ten feet, and congealing there, formed a half cast on that side of the tree. In the group, first reached, there are more than ninety of these standing casts. The burning of the trees have left wells measuring the depth of the lava. The spread of the roots is distinctly shown at the bottom. Other trees were titled leaving the casts in inclined positions. Many of the trees, however, were prostrated, encased with lava and floated as on a torrent stream and left in confused drifts along the margins. The casts of these are seen as horizontal tubes or tunnels. They reach a diameter of five feet, and

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P. S.—SAW YOUR AD. IN ROCKS and MINERALS.

have been traced for more than a hundred feet in length. In some, the furrows of the bark are tracable, and where the tree has been broken, the grain, or annular rings, have left their imprint in the cast.

In these drifts, under the increased heat of the burning wood, the field is left in a condition of jagged cinder.

Trees that were alive and full of sap were not consumed before a casing was frozen around them. If a stick is dipped into melted paraffin and removed, a cooled crust of wax will be found upon it. So, the temperature of the tree with its sap caused the cooling of the lava before it was ignited. But with dead trees with pitch concentrated especially in the roots, the heat became so intense as to cause the surfaces of the walls to "run" forming ribs, stalactite "drippings" and, like syrup, coils in worm-like statuary on the floors.

The field is within the National Forest Reserve and has been set aside as "an area possessing features and objects of special scientific interest." Under the protection of the Forest Service its specimens are to be preserved from molestation. Trails are being extended to reach the drifts and many of the casts, and no effort is being spared to make the pleasure and profit of visitors complete.

At the entrance a rustic museum has been constructed into which is being gathered many of the detached drippings where they may be more readily seen. At the museum will be found a Registration Book and each visitor is urged to leave his record within this.

Mr. Geo. L. English, one of the world's greatest mineralogists and author of **Getting Acquainted With Minerals,** a very popular book for beginners, was a recent visitor to the Houston Museum of Natural History, Houston, Texas, where he inspected the very fine mineral collection on display. Mr. English was formerly consultant mineralogist to Ward's Natural Science Establishment, Inc., of Rochester, N. Y.

Malachite

This Malachite from the Belgian Congo was obtained primarily for cutting. It was so good looking however, that we have broken up a number of pieces of various sizes and offer them as specimens. We are sure that you will be delighted with its bright green color and banded structure.

1" 20c; 1½" 35c; 2" 75c; 3" $1.50.

Beccarite, Wis. A very rare variety of zircon. Some in tiny xls in pegmatite and some massive.

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Ampangabeite, Madagascar. A neobate of uranium, etc. Radioactive. In crude xls.

¾" 50c; 1" 75c; 1½" $1.50.

Sodalite, Ontario. Another lot of nice blue material.

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R. W. TUTHILL

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THE CAVE REGIONS OF KENTUCKY

By HARRY W. MAUNTEL, Asst. Principal

Mendota, Illinois

The region in the vicinity of Cave City and Horse Cave, Kentucky, is one of the most interesting geological sections of the Central United States. These are many caves in this section of the state chief of which are the following: Mammoth, Great Onyx, Crystal, and Sand Cave of Floyd Collins fame. There are hundreds of smaller caverns all of which give us a geological story of chemical changes now taking place underground in the limestone strata throughout this section of Kentucky*

Horse Cave and Cave City are in Edmonson County, 100 miles south of Louisville, almost in the center of the state. Horse Cave is located on U. S. Highway 31-W, 68, Ky. 70. Cave City is a few miles southwest of Horse Cave on U. S. Highwav 31-W. Mammoth Cave is 7 miles northwest of Cave City on SR-70.

Here one is transported into the depths of the earth which appears to be a different world. With temperatures hovering around 56 degrees during both winter and summer, one is astonished at the sudden change from that of the outside. Within these beautiful caverns one may behold the handiwork of nature, which through countless thousands of years has built up the numerous formations of calcite stalactites, and stalagmites.

These calcite formations in most cases are a soft onyx of different hues from milky, cream, to light brown, and in a few instances a very dark color or nearly black. These formations vary in shape, size, and numbers. In some regions of the caves they are long and very thin (macaroni stalactites). In other regions the formations are gigantic in the shape of drapes, huge columns, stalactites many feet long hanging from the roof of the cave and stalagmites many feet high built up from the floor of the cave.

It is very interesting to note how these beautiful formations were formed. Ages ago this section of Kentucky was probably a body of water. Then it began to recede or fill up due to an alluvial deposit of minute shells of fresh-water animals and other matter. This mass, under a certain amount of pressure from above accumulations through ages, formed limestone. But nature is continually changing, therefore water, with the presence of carbonic acid, after a time, caused the gradual dissolving of some of these limestone deposits which in turn produced caverns and caves. Even today continual changes are taking place. Water, rich in calcium bicarbonate, may seap through the limestone from above the roof of the cave, drop by drop. As these drops gradually evaporate which liberates carbon dioxide there remains crystals of calcium carbonate. Millions of these crystals builtup, form a stalactite which grows down from the roof of the cave. Drops that evaporate and leave behind crystals of calcium carbonate on the floor of the cave may form a stalagmite. If the stalactite and stalagmite are joined they are called columns. In some parts of Kentucky caves the caves are nearly filled with these formations.

Some of the drier parts of the cave have gypsum crystal formations suspended from the roof of the cave. These formations are called gypsum feathers or flowers. Many of these fragile formations appear to one as a fairyland, with each flower form of the earth represented in diamond-like brilliance.

The history of some of these caves is interesting especially that of old Mammoth Cave where much of the saltpeter of the War of 1812 was secured.[1] Here one todav can see the saltpeter vats that were used during early colonial days when Kentucky was young. Back before white man discovered Mammoth Cave, the Indians used it as a place of refuge from the elements of nature, Indian

(*)—In Edmonson County there are five hundred known caverns, and every geological formation to be seen in any of them is found, also in Mammoth Cave's series of caverns.

(1)—Some writers claim that it was the saltpeter obtained from these caverns that won the war of 1812.

enemies and wild beasts.*

Today the United States is creating a great National Forest in this region which will include much of the Cave country around Cave City and Horse Cave, Kentucky. This beautiful and interesting region will then belong to the people of the United States. We should learn to appreciate and help preserve these national forests and parks so that future generations may enjoy nature's wonders in earth and above earth.

For the collector of geological material there may be obtained numerous specimens taken from small caverns throughout this region. The specimens are similar to those of the well known caves. Many geological stands line the highways to the Cave region of Kentucky where one may purchase calcite formations of all sizes both in the rough and polished. This region will prove a rich field for the geological collector who is interested in cave formations.

(*)—A number of human skeletons (mummies) and implements of Indian culture have been found in Mammoth Cave.

According to records Mammoth Cave was discovered by a hunter named Houchins, who chased a bear in the cave in 1798. Some reports state that Mammoth Cave was discovered in 1797.

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5th NATIONAL OUTING of the ROCKS AND MINERALS ASSOCIATION SUNDAY, MAY 23, 1937

Each year the Rocks and Minerals Association holds a national outing the purpose of which is to stimulate the interest in mineral collecting. It is also the period when many amateurs are introduced to their first visit to a mineral locality. Aside from collecting minerals, the outing also gives one the opportunity of greeting old friends and in making new ones, in having his unknown minerals identified and even in exchanging specimens with other collectors. Truly an outing is a very happy event to which thousands look forward with much interest and pleasure.

As in previous years, the Rocks and Minerals Association extends a cordial invitation to all readers of **Rocks and Minerals,** and to the general public, to participate in its National Outing.

If an outing is to be held near your city it is suggested that you register at an early date with the director and if an answer to your letter is desired, enclose a self-addressed stamped envelope. If no outing is to be held in your vicinity, then hold one of your own, inviting some of your friends to join you.

If those having cars could accommodate one or more extra passengers, it would be considered a great favor if they would so inform their directors. Collectors should wear stout shoes and rough clothes and be provided with mineral hammer, collecting bag, small note book, pencil, magnifying glass, pen knife, tissue and newspaper. Also, bring lunch.

NOTE—Please be careful around mines and quarries. Neither the Association nor the directors nor even the owners of property on which outings may be held will be responsible for any accidents incurred by those participating.

The states in which outings will be held and their directors are as follows:

California
(Northern Branch)

Directors—Wilfred C. Eyles, 36 Fountain Street, San Francisco; John Melhase, 675 Vincente Avenue, Berkeley.

Locality—Write to directors for particulars.

Meeting Place — Offices of the Northern California Mineral Society, 268 Market Street, San Francisco.

California
(Southern Branch)

Will be held Sunday, May 16

Directors—E. V. Amrine. Pasadena Junior College, Pasadena, assisted by Mrs. Quita Ruff.

Locality—Pegmatite dikes of Juniper Flat, with excellent micas, feldspars, quartz and usual associates, and graphic granite eminently suitable for polishing, will be the principal ground, with a trip later to the Winchester Magnesite quarry.

Meeting Place—Nuevo, Riverside Co. at 10:00 a. m.. Sunday, May 16. The route will be marked.

Note—Due to interfering dates this trip will be held one week earlier than the regular outing.

The Annual Meeting of the Mineralogical Society of Southern California will be held at the Altadena Golf Club on Saturday, June 12. The meeting is for members only.

Colorado

Director—F. C. Kessler, 1020 Macon Avenue, Canon City.

Locality—Dinosaur beds, Four Mile Canyon near Canon City.

Meeting Place—2:00 p. m., Canon City High School.

Illinois

Director—H. W. Mauntel, 801 6th Avenue, Mendota.

Locality—Write to director for particulars.

Meeting Place—Write to director for particulars.

Massachusetts

Director — John Kitson, 30 Briggs Street, Easthampton.

Locality—Strickland Quarry, Portland, Conn.

Meeting Place—At the quarry at 11:00 a. m.

Note—Prof. B. N. Shaub of Smith College, will address the group on minerals of the Strickland Quarry.

Nevada

Director—Mrs. Rader Thompson, Box 225A, Rt. 1, Reno.

Locality—Lake Tahoe area.

Meeting Place—9:00 a. m., in front of the Court House, Reno.

New York

Director—Peter Zodac, Box 29, Peekskill.

Locality—Strickland Quarry, Portland, Conn.

Meeting Place—At the quarry at 11:00 a. m.

Note—The New York, Massachusetts and Rhode Island groups will convene at this quarry. See article on the quarry in this issue.

Ohio

Director — George C. Whitaker, President Cleveland Mineralogical Society, 3915 Forestwood Drive, Parma.

Locality—Limestone quarries of The Kelly Island Lime & Transport Co., Clay Center, Ohio.

Meeting Place—Corner of Brookpark Road and Riverside Drive (adjacent to the municipal airport). at 8:30. Cleveland.

Note—The Clay Center district is a "happy hunting ground" for mineral collectors. Profuse specimens of celestite, fluorite (fluorescent), calcite, sphalerite, pyrite and marcasite are available.

Rhode Island

Director—Alonzo Quinn, Dept. of Geology, Brown University, Providence.

Locality—Strickland Quarry, Portland Conn.

Meeting Place—At the quarry at 11:00 a. m.

Texas

Director—Frank Duncan, Terlingua.

Locality—Terlingua Mining District which is one of the richest quick-silver areas in the world; the new Chisos Mountains National Park; and the Grand Canyon of the Rio Grande with vertical walls over 2,000 feet in height.

Meeting Place—Terlingua Postoffice at 10:30 a. m.

Utah

Director—Junius J. Hayes. 1148 E. 1st South, Salt Lake City.

Locality—Marble and calcite quarries on the west side of Utah Lake at Pelican Point.

Meeting Place—L. D. S. Business College, Main and North Temple Streets, at 9:00 a. m.

As Daylight Saving Time may be in effect throughout the areas covered by the Outing. members are requested to be governed accordingly.

To those planning to attend the Strickland Quarry Outing, we wish to advise that the New York, New Haven and Hartford Railroad will run a Sunday excursion train from New York City to Meriden, Conn., leaving New York at 8:09 a. m. (D. S. T.) Round trip fare $2.00. At Meriden, bus service can be obtained to Middletown, 10 miles away.

Collectors travelling in groups of 25 or more may obtain special rates if they will make application to their local ticket agents.

Mr. Harry Grahl, 885 Cauldwell Avenue, Bronx, New York City, has kindly volunteered to take charge of the train service from New York to Meriden. Those planning to go by rail are advised to communicate with him.

After the outings are over, we would appreciate brief resumes from directors on the activities advising the number of collectors who attended, and brief descriptions of important finds.

PETER ZODAC,

Acting National Director of Outings,
April 1, 1937.

COLORADO MINERALS

Wire gold: Masses on face of rock 1" to 1x1½"—$2.50 to $10.00.

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THE AMATEUR LAPIDARY

Conducted by ARTHUR KNAPP
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Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

A VISIT TO NEW YORK

Mr. Zodac and I recently paid a visit to some professional lapidary shops in New York. Some of our readers may be interested to learn that our little magazine is well-known in the gem trade. We were certainly well received. The subjects of the sources of gem materials and the technique of cutting and polishing were both discussed at length. We were invited into the shops and shown in detail anything we asked about.

Many beginners probably have had the same experiences that I have had in my early efforts in learning how to polish gems. I went to some professional shops and asked how to polish gems and got no information. I realize now what a mistake I made. If one wanted to learn to play tennis, it would be just as sensible to go to see Tilden or Vines and ask them how to play tennis without balls, tennis racket or court.

The beginner has to learn the language of a game or a profession first. I found an enormous difference in my reception in professional shops after I had cut my first few crude cabochons and had something to show and something to talk about. From that time on I have had wonderful talks with dealers and cutters. I find them enthusiastic artists, with a love for beautiful gems. I know of one professional who cuts odd gems just for fun, when business is slack.

ARTHUR KNAPP.

INCIDENTALLY.

This department does not want to get highbrowed nor cater entirely to the advanced amateur. We would like very much to hear from instructors or students in schools, where lapidary work is being undertaken. We would like to know what is being done, what material is used and what equipment is provided.

ARTHUR KNAPP.

DR. WADE'S FLOW THEORY

I think the polishing of gem material takes place by a combination of friction with enough heat on the individual particles to lessen molecular attraction, and mechanical force of high speed or surprise attack.

This surprise attack on the extreme tips of the hills or sides of voids combined with the lessening of molecular attraction by heat tears off particles instead of shoving the surface around. Try polishing a piece of colored material and watch your lap become colored. The heat developed by a lap is not sufficient to develop a plastic surface on the usual minerals that are polished.

—R. A. Lohse, 1813 Berkeley Way, Berkeley, Calif.

GEORGE B. GOODWIN
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NEW YORK MINERALOGICAL CLUB'S 50th ANNIVERSARY EXHIBIT

The second phase of the celebration of the New York Mineralogical Club's 50th Anniversary was a big exhibit by club members, allied clubs and institutions in the Maxwell Hall of the American Museum of Natural History, New York City, on Saturday, March 13th. The exhibit was a huge success, the attendance unusually large. The visitors were simply amazed at the beauty of the specimens on display and many of them regretted that the exhibition could not last longer than the day.

It is regretable that space prevents the description of all the groups of minerals that were on display. There were such individual exhibits as some rare minerals by Frederick I. Allen; new and recently described minerals by the American Museum of Natural History; quartz-inclusions and psuedomorphs by J. Willard Baker; minerals from Franklin N. J., by William H. Broadwell; New Jersey Minerals by William C. Casperson; minerals from North Carolina by John M. Downes; a suite of polished and crystallized minerals by Jay T. Fox; minerals from Chuquicamata, Chile, by Richard V. Gaines; magnetite crystals from Monroe, N. Y., by Herbert Gray; mineral specimens and photomicrographs by Alfred C. Hawkins; minerals of Broadway by James G. Manchester; polished and rough gem minerals by W. H. McClelland; Alaskan epidotes by Arthur Montgomery; selected specimens by James F. Morton; tourmalines and beryl from pegmatites in Maine and New Hampshire by Zelman Nalven; minerals from Summit, N. J., by Allen Northup; minerals collected by the Rainbow Bridge-Monument Valley Expedition by Daniel T. O'Connell; outstanding Connecticut minerals by Lillian M. Otersen; varieties of quartz by John W. Radu; minerals of New York City by Gilman S. Stanton; Pennsylvania minerals by Oscar Tielman; minerals from Tilly Foster, N. Y., by J. N. Trainer; minerals from Paterson, N. J., by Ernest Weidhaas; suite of Chinese jade-carved objects showing variation in color by Herbert P. Whitlock; and a combination of minerals from Bedford, N. Y., Franklin, N. J., and Spruce Pine, N. C., by Leo Neal Yedlin.

Fluorescent minerals and lamps were admirably well represented by John A. Grenzig and by the Ward's Natural Science Establishment, Inc. O. Ivan Lee demonstrated the reversible photosensitivity of hackmanite, and displayed crystal suites of minerals of the rarer metals.

For those interested in micromounts, there were two very interesting exhibits, one by George E. Ashby and the other by Herbert Baldwin.

The teaching materials used in classes in elementary mineralogy were displayed by the College of the City of New York; minerals collected by students of the Geology Club, Day Session, College of the City of New York; minerals used in the construction of the telephone by the Geology Club, Evening Session, College of the City of New York.

Micro-projection of mineral color effects and an improved specific gravity balance were demonstrated and shown by the Department of Mineralogy, Columbia University.

A demonstration of the cutting and polishing of minerals and ornamental stones was made by John Vlismas.

Many interesting books on mineralogy were also displayed, among them being—old illustrated books on mineralogy by Frederick H. Pough; latest reference books by McGraw-Hill Book Co. and by John Wiley & Sons, Inc., mineralogical books by the Museum Bookshop of the American Museum of Natural History; old and recent books on mineralogy by Peter Zodac; and a provisional trial description of an orthorhombic mineral for the new Edition of Dana's System by Drs. M. A. Peacock and Harry Berman of Harvard University.

Petrographic and mineralogical microscopes were exhibited by Bausch and Lomb Optical Co.; by E. Leitz, Inc.; and by Spencer Lens Co.

Reagents for chemical microscopy, with demonstration, were exhibited by R. P. Cargille. Spectroscope, blowpipe sets, and minerals by Eimer and Amend; the Nichols refractometer by Lyman Nichols; crystallight by H. T.

Strong; and **Rocks and Minerals Magazine** by Peter Zodac.

Too much credit cannot be given Dr. Frederick H. Pough, Secretary of the New York Mineralogical Club, for the successful issue of the exhibition. Not only did he have charge of the arrangements of the exhibits but he corresponded also with the exhibitors as to their specimens and skilfully avoided duplication. The result was a most orderly and varied selection of choice representative specimens.

The effect of the exhibition was the stimulation of a marked and keen interest in mineralogy. This was manifested by repeated remarks by visitors that they regretted it was to be for just the one day. Teachers especially wished it could have been continued longer that an opportunity might be afforded them to bring their students to the Museum to see this really remarkable exhibition.

A troop of Boy Scouts was present and not only assisted in directing visitors about but also mounted guard over the exhibits during the intermission between the afternoon and evening displays.

Among the exhibitors, 30 were members of the Rocks and Minerals Association.

PETER ZODAC.

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Cabinet Specimens: Grape Rock from Utah. The Waldru Shop has supplied some of the most beautiful concretions ever found. This breccia consists of a pretty mass of red, yellow, white and lavender agate nodules, grouped together resembling a cluster of grapes. All complete collections should include this specimen. 1 in by 1 in, 25c; 1 in. by 2 in., 50c; 2 in by 2 in., 75c; 2 in. by 3 in., $1.00; 3 in. by 3 in., $1.50; extra fine and large specimens, 4 in. by 4 in. and larger, $3.00

Cut Gems: We have just received from China, a shipment of hand-carved Rose quartz pendants, maximum length, 1½"; maximum width, 1". Top drilled ready for loop. Will make excellent necklaces, $1.00/specimen. Two perfectly matched pieces, similar to the above description, maximum width, 5/8"—$1.75/pair.

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R. and M. Helps a Collector!

Ironwood, Mich. — ROCKS AND MINERALS sure has helped me out in getting many minerals for my collection. — Lawrence Eddy.

After More Rock Hounds!

Lawndale, Calif.—I am enclosing $1.50 as payment for another year's subscription to ROCKS AND MINERALS. Am sorry to be so late in renewing but I have been sick with the flu for a month. However, after reading again all back numbers of ROCKS AND MINERALS, I am now O. K. and ready to go out and look for more "rock hounds" to join the Rocks and Minerals Association.—H. F. Frodell.

Verv, Very Interesting!

Fruita, Colo.—I wish to congratulate you on the latest March issue of ROCKS AND MINERALS. I think it is the most interesting number that I have seen during the last two years that I have been a subscriber, with the exception of the Agate Number which is in a class by itself. Those two desert articles especially appealed to me but I enjoyed the whole magazine. ROCKS AND MINERALS is one of the very few magazines that I can truthfully say I read everything in every issue, including the advertisements, and find it all interesting. —W. C. Minor.

Rocks and Minerals of Much Help!

Glasgow, Mont.—I had never seen ROCKS AND MINERALS until recently. Am very much pleased with it. In my work as a librarian, I have had to look up minerals from different sources and your magazine has been of much help to me. — Miss Sophia Bowling.

Fer Gosh Sakes!

West Haven, Conn.—I especially enjoyed the Quartz number. This mineral seems to fascinate me more than any other that is found in this part of the country. Another thing, "fer gosh sakes" don't let those collecting trip articles die out. I insist on at least one in every issue. I am even going to try to pound one out myself sometime.—Herbert A. Smith.

Nary a Sneer!

Philadelphia, Pa.—I consider myself the best sneerer I ever met, but there wasn't a thing I could use my talents on in the March issue.—A. D.

Rocks and Minerals is Fine!

Boonville, Mo. — Your magazine, ROCKS AND MINERALS, is fine. I was most fortunate in having discovered it. Please chalk me up for another year's subscription.—Wm. van Ravenswaay.

Wants Calcite Number!

Jersey City, N. J.—I want to congratulate you on the Rock Crystal Number. The articles were excellent; was especially interested in the one on how to distinguish right from left hand crystals. Would like to see another issue devoted to a quartz mineral; also one on calcite. In fact, I'm surprised that someone hasn't written a book on calcite. I do not know of another mineral which shows more variations. — Allen Northup.

Hits the Right Spot!

Los Angeles, Calif.—I want to express my appreciation of ROCKS AND MINERALS after my first year as a member of the Association. For me it hits the right spot.—W. J. Boyd.

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Sard, 2x3, polished 1.00
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A PAINT MINE NEAR PALMERTON, PENN.

By A. JOSEPH STANLEY

Palmerton, Penn.

When I first came to Palmerton, several years ago, I heard the people here speak of the "paint mines." I thought this belonged to the same category as the "rock candy mountains." But soon I learned that the paint mines actually existed. There have been about 10 of them in the vicinity of Palmerton but only one is in operation today.

Palmerton, a little city of about 7,000, is in the extreme southern part of Carbon County, and on the north bank of Lehigh River, Carbon County, is in the eastern part of Pennsylvania.

The only mine in operation is the Hazard Mine of the Prince Manufacturing Company, and is located about 350 feet north of the main highway, Route 309, about one mile west of Delaware Street, the main street of Palmerton.

I tried several times to visit the mine but on each occasion failed. If there wasn't a cave-in, there was a "push-up." A "push-up" was an odd phrase to me but that is actually what happens at times.

This is a tunnel mine, the tunnel extending about 3,000 feet north into Stony Ridge. Originally the tunnel was 7 feet high throughout but it is much less now, at least in many places. The floor of this tunnel for almost its entire length is clay which at times heaves or pushes up, and if not taken care of would eventually close the tunnel entirely. The "push-ups" are gradual. But during the spring of 1936, there was one "push-up" that was not gradual, due to spring thaw. In some places the tunnel is only 4 feet high due to these "push-ups."

The roof of the tunnel is a cement stone (limestone) with here and there some aluminum-bearing shale. The side walls are sandstone, shale, or clay. Occasionally a siderite stalactite will be found which is about 50% pure.

The paint ore is a bluish-gray siderite with a sprinkling of pyrites. It resembles limestone in appearance but its heavier weight identifies it. Very rarely, small brownish crystals, not identified as yet, which appear purplish-blue in reflected light, are found on a matrix of siderite. There is also a small vein of crystalline calcite in the tunnel.

The ore is first crushed, then roasted, and finally ground. Roasting turns it into several shades of red. The material is extensively used as a metallic red paint for use under the most severe conditions of exposure as for bridges, railroad cars, roofing, etc.

The output of the Hazard Mine is about 5 tons per day. The vein averages from 18 to 30 inches in width.

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